December 2011 MSS/LPS/SPS Joint Subcommittee Meeting
ABSTRACT SUBMITTAL FORM

The submission of an abstract is an agreement to complete a final paper for publication and attend the meeting to present this information. Complete all information requested in the author and co-author information sections; the first author listed will receive paper acceptance notices and all correspondence. Abstracts must be submitted electronically; submittal instructions are located in the call for papers. **The abstract deadline date is June 13, 2011.**

ABSTRACT INFORMATION

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MANAGEMENT APPROVAL

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Unclassified Abstract

(250-300 words; do not include figures or tables)

The J-2X engine was originally designed for the upper stage of the previously cancelled Crew Launch Vehicle. Although the Crew Launch Vehicle was cancelled the J-2X engine, which is currently undergoing hotfire testing, may be used on future programs. The J-2X engine is a direct decendent of the J-2 engine which powered the upper stage during the Apollo program. Many changes including a thrust increase from 230K to 294K lbf have been implemented in this engine. The rotor-dynamic stability of the fuel turbopump is highly dependent on the tangential velocity of the fluid as it enters the the front face impeller seal. Rotor-dynamic analysis predicts that a much lower tangential velocity will be required for stability than was needed for previous engines. The geometry at the seal entrance for this engine is very complex and vastly different than previous engines. In order to better determine the fluid dynamics and tangential velocity in this seal several CFD simulations were performed. The results of these simulations show that for this seal geometry a great reduction in the tangential velocity is to be expected. The simulations also provided insight into methods that could be employed to drive the swirl velocity to near zero. Unsteady and time-averaged results of several simulations will be presented.